

MorphoAccess® VP Series

Installation Guide



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Revision History

The table below contains the history of changes made to the present document.

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Section 1: Introduction

MorphoAccess® VP Terminal

Congratulations for selecting the MorphoAccess® VP Series, first ever Physical Access Control terminals to integrate the state of the art multimodal technology combining finger vein and fingerprint biometrics.

These terminals bring to access control systems the strong assets of the finger vein/fingerprint multimodality:

- the capability to address those individuals who usually experience difficulties to use mono-modal biometric devices,
- an excellent FRR@FAR ratio, which allows a high security level without affecting comfort of use,
- an enhanced resistance to spoofing (by combining the protection mechanisms intrinsic to each technology and also by making the most of the new characteristics resulting from the fusion of the two biometrics),

while offering the same easiness of use which makes finger biometrics-based systems quickly adopted by end-users.

In addition, the MorphoAccess® VP Series have been designed with in mind two key concepts:

- attractiveness (choice of texture, quality of finishing...),
- practicality at installation and connection, as illustrated by this installation guide.

We definitely believe that our MorphoAccess® VP Series will come up to the expectations of our faithful and most demanding partners, as the ultimate solution for Security, Accuracy and Performance of their equipments!

To ensure the most effective use of your MorphoAccess® VP Series terminal, we recommend that you read this Installation Guide completely and attentively.

Scope of the document

This guide deals with the installation of MorphoAccess® VP Series, which is made up of following list of products:

Products		Multimodal finger vein/ fingerprint biometrics	MIFARE®/DESFire® Contactless smartcard reader
MorphoAccess® VP Series	MorphoAccess® VP-Bio	X	
	MorphoAccess® VP-Dual	X	X

Safety Instructions

The installation of this product should be made by a qualified service Person and should comply with all local regulations.

It is strongly recommended to use a class II power supply at 12V [9V-16V] and 1A. min in conformity with Safety Electrical Low Voltage (SELV). The 12V power supply cable length should not exceed 10 meters.

This product is intended to be installed with a power supply complying with EN60950, in accordance with the NEC Class 2 requirements; or supplied by a listed EN60950 external Power Unit marked Class 2, Limited Power source, or LPS and rated 12VDC, 1A minimum.

In case of building-to-building connection it is recommended to connect 0V to ground. Ground cable must be connected with the terminal block 0V GND.

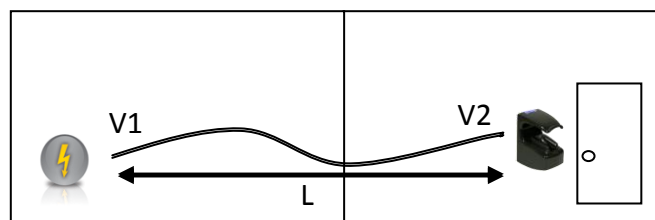
Note that all connections of the MorphoAccess® VP Series terminal described hereafter are of SELV (Safety Electrical Low Voltage) type.

Wiring Recommendations

Morpho recommends to use a gauge AWG18 for 12V power supply when POE supply is not use.

For information, this table shows the maximum weakening voltage observed on the terminal MorphoAccess® VP:

Gauge AWG	Diameter (mm)	Maximum weakening @ 1m	Maximum weakening @ 5m	Maximum weakening @ 10m
18	1.02362	0.021 V	0.105 V	0.209 V
20	0.8128	0.033 V	0.166 V	0.333 V
25	0.45466	0.106 V	0.531 V	1.062 V
28	0.32004	0.213 V	1.064 V	2.129 V



Weakening = loss of power due to wire resistance and its length

$$V2 = V1 - \text{Weakening}$$

Europe information

Morpho hereby declares that the MorphoAccess® VP Series terminal has been tested and found compliant with following listed standards: EN302 291-2 V.1.1.1 (2005-07) + recommendation 1999/519/CE with standard EN 50364; EN 301 489-3 V.1.4.1 (02), and low voltage Directive 2006/95/CE: CEI60950-1:2005 2nd edition.

USA information



This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Responsible Party:

Morpho,
Le Ponant de Paris
27, rue Leblanc
F 75512 PARIS CEDEX 15
FRANCE

NOTE: *This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one of the following measures:*

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Shielded cables must be used with this unit to ensure compliance with category B FCC restrictions.

Recommendations for terminal implementation

To secure properly an access, Morpho recommends installing the MorphoAccess® VP terminal as a part of the typical Access Control environment, described in the figure below.

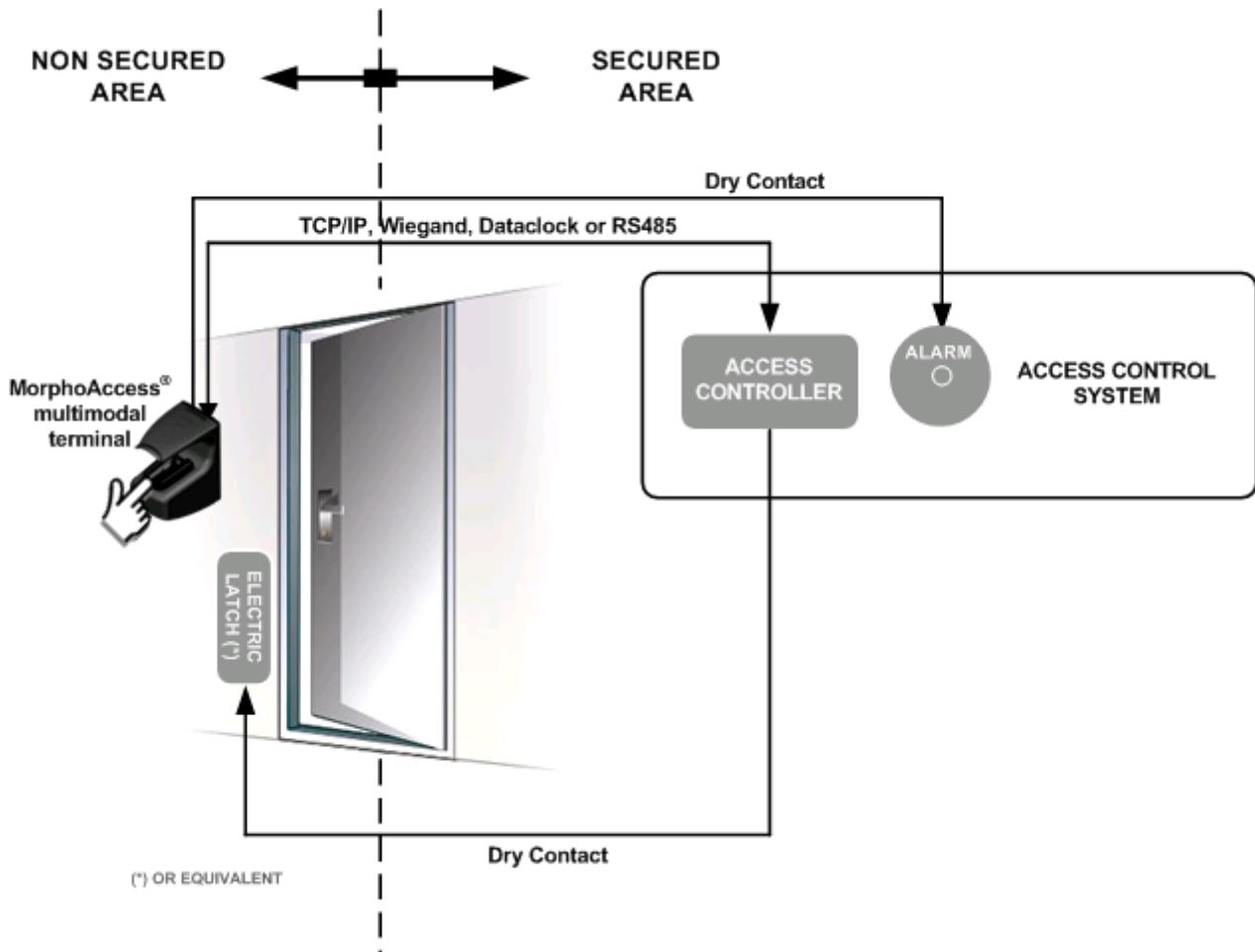


Figure 1: Implementation Recommendations

This environment comprises:

- **The MorphoAccess® VP terminal itself**

Its role is to perform one-to-many multimodal biometric identification or one-to-one multimodal biometric verification, i.e. to identify the individual who is presenting his finger on the terminal sensor by comparing his multimodal biometric data with the references previously stored in the terminal database (in the form of multimodal biometric templates) or to verify his identity using the reference stored in a contactless card presented to the terminal.

- **An Access Controller (3rd party product)**

The Controller is the element which controls the access rights of the individuals to the secured area. For that reason, it must be located in the secured area.

The individuals who are authorized to access the secured area have their User ID listed in a so-called "White List" (in contrast with a black list).

The MorphoAccess® VP terminal and the Controller are communicating according to one of the TCP/IP, Wiegand, Dataclock or RS485 protocols:

- The MorphoAccess® VP terminal sends User ID to the Controller
- The Controller sends its decision to the MorphoAccess® VP terminal (which displays GREEN light if access is granted or RED light if denied)
- The MorphoAccess® VP terminal sends an alarm signal to the Controller as soon as a malicious operation (terminal pulled out from the wall or having its bottom cover opened out of maintenance operations) is detected; refer the paragraph dealing with anti-pulling and anti-tamper switches for more explanations.

The Controller is part of the global Access Control System of the secured area, which for instance can administrate the White List of the Controller and receive diaries of the decisions taken by the Controller.

- **An Alarm (3rd party product)**

This element is connected to the MorphoAccess® VP terminal through a dry contact.

The MorphoAccess® VP terminal sends the command to activate the Alarm as soon as a malicious operation (terminal pulled out from the wall or having its bottom cover opened out of maintenance operations) is detected; refer the paragraph dealing with anti-pulling and anti-tamper switches for more explanations.

- **A Door Electric Latch or equivalent (3rd party product)**

This element once activated opens the access. The Controller is the one which sends the command to activate the latch if access is granted (i.e. if the individual's User ID is listed in the Controller White List). Connection between these two elements is done through a dry contact.



Section 2: General Description

Box opening

At the box opening, components shall be extracted from the white protection casing as depicted in the pictures below.

Extract the bottom cover and the wall plate (which are not screwed to the terminal) and keep them separate until the installation of the terminal is completed. The screwing of the bottom cover is the last stage of the installation.

Not to forget to withdraw the sachet of screws, bolts and connectors from the white protection casing.

The protection accessory provided is optional: it is recommended in the event of installation in a strong parasitic luminosity area.

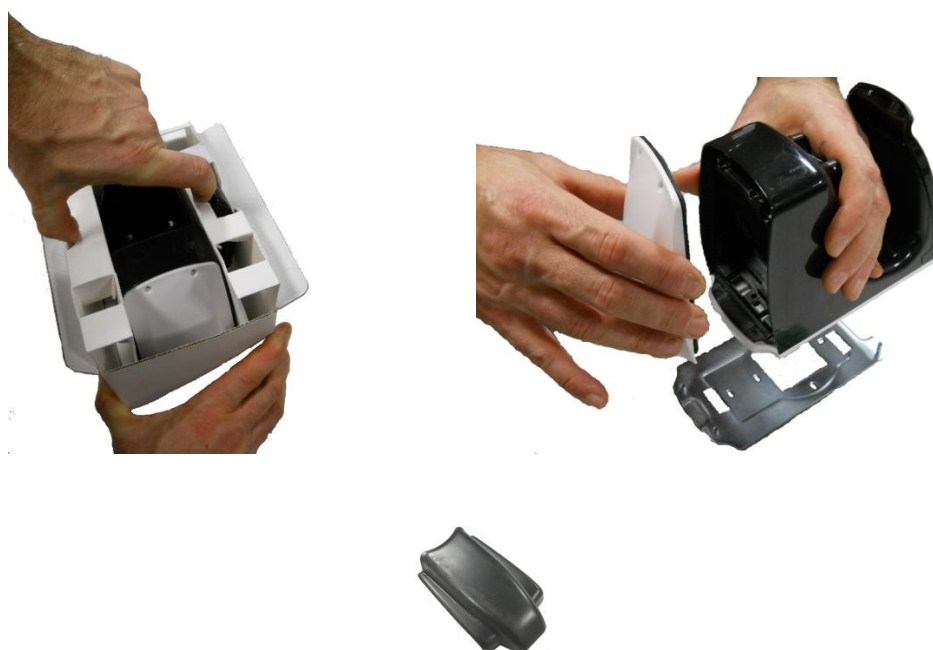


Figure 2: Box Opening

Components of the initial package

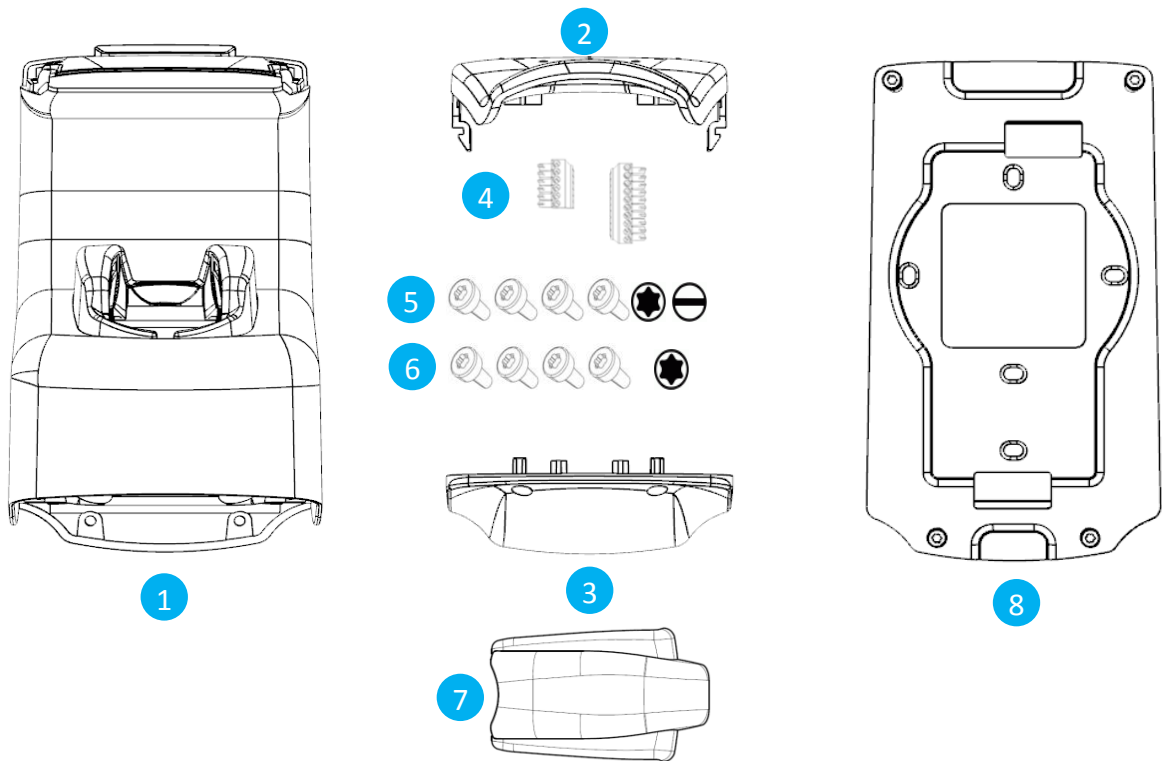


Figure 3: Box Content

1. One (1) terminal's body
2. One (1) top cover fixed at the body of the terminal
3. One (1) bottom cover
4. Two (2) block connectors (6 and 10 pins) for terminal's joint blocks
5. Four (4) M3X10 Screws (for terminal fixing to the wall plate) – T10 Torx and 4mm flat print
6. Four (4) K25x8 Screws (Bottom cover fixing) – T8 Torx Print
7. One (1) protection accessory (which usage is optional)
8. One (1) wall plate

Terminal's front view description

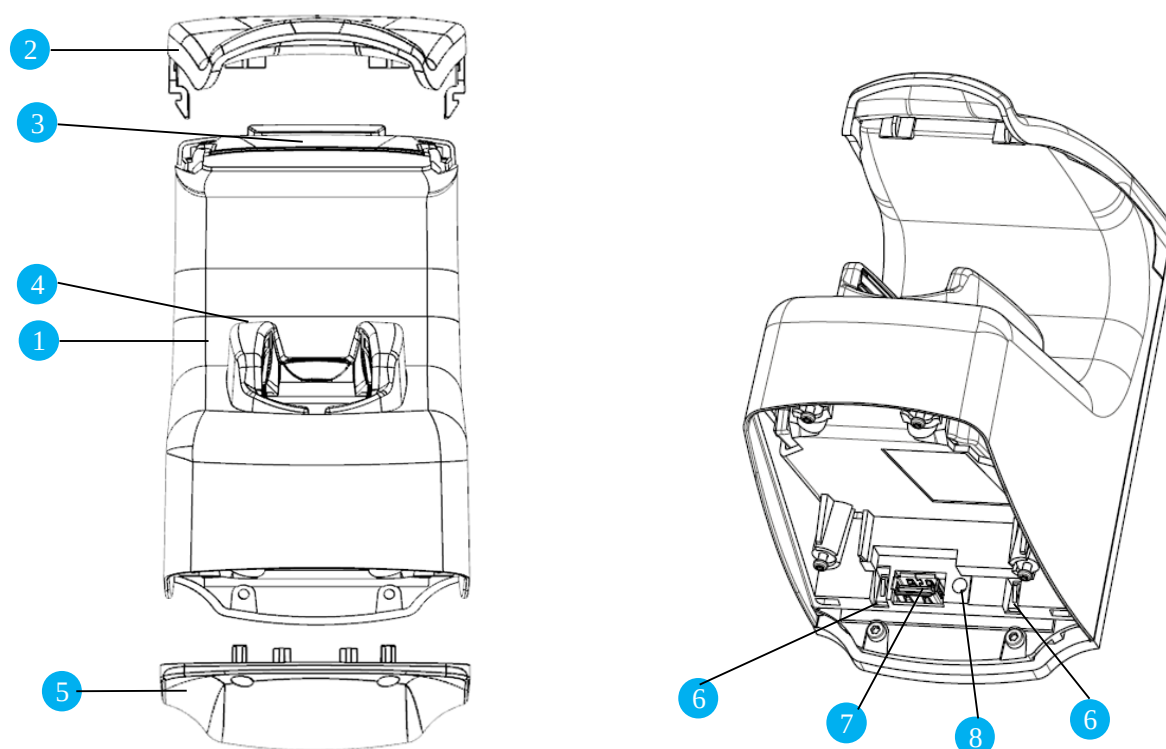


Figure 4: MorphoAccess® VP Series terminal front views

1. Terminal's body
2. Top cover
3. Contactless card reader
4. Multimodal biometric sensor (optical)
5. Bottom cover
6. Anti-tamper switches
7. USB port (for configuration and settings with a USB mass storage key, or for installation of a Wi-Fi™ USB dongle)
8. Reset button

Terminal's rear view description

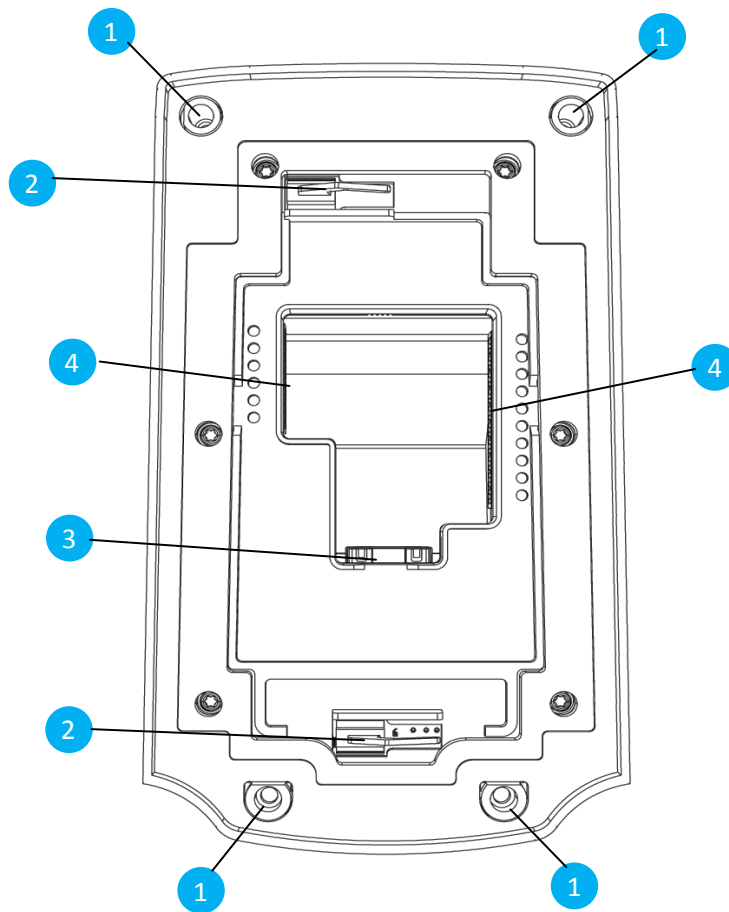


Figure 5: MorphoAccess® VP Series terminal rear view

1. Mounting holes (4)
2. Anti-pulling switches (2)
3. RJ45 (Power Over Ethernet)
4. Terminal blocks (2)

MorphoAccess® VP Series Technical Characteristics

Item	Description
Access control modes	Identification (search for multimodal biometric data in a local database)
	Authentication with contactless card, with or without multimodal biometric data check (only if terminal equipped with a smartcard reader)
	Multi-factor: identification or authentication (only if equipped with a smartcard reader)
	Proxy: the access control check is fully driven by a remote system
Man Machine Interface	Multi color LED
	Multi tone Buzzer
Biometrics	MorphoSmart™ FINGER VP Biometric module inside for multimodal biometric comparison. With 500dpi, 256 gray levels optical sensor, PIV IQS certified by the FBI
	False Acceptance Rate (FAR) adjustable from 10^{-2} down to 10^{-8}
	Database capacity: 5,000 users (standard) or 10 000 users (with specific license).
Log capacity	8,000 records (one per access request)
LAN/WLAN connection	For terminal configuration and data transfer: Ethernet 10/100 Base T Or Wi-Fi™ Wireless LAN (option), WEP and WPA encryption available Either TCP or SSL protocol
RFID cards (MorphoAccess® VP Dual only)	MIFARE® 4k
	DESFire® 2k, 4k, 8k
Output serial port	The serial port supports WIEGAND, DATACLOCK ISO2, and RS485 protocols
Output relay switches	Access granted: 1 switch (either "open" or "close" in default state)
USB host port	Front port for terminal configuration through a USB mass storage key or for Wi-Fi™ USB dongle.
Input signals	LED1/LED2 to activate the access granted relay

Item	Description
Power supply	Power Over Ethernet RJ45 connector Or 9 to 16 V DC power supply (1A min @12V)
Security of the terminal	Anti-tamper switches. Anti-pulling switches. Tamper and/or pulling detection: one relay switch ("close" in default state).
Size and weight	W x H x D: 90 mm x 160 mm x 125 mm (3.54" x 6,3" x 4,92") 675g with wall plate 515g without wall plate
Environmental conditions	Operating temperature -10 °C to + 50 °C (14°F to 122°F)
	Operating humidity 10 % < RH < 80 %
	Storage temperature -20 °C to + 70 °C (-4°F to 158°F)
	Storage humidity RH < 95 %
	IP65 rated for outdoor use (once wall-mounted)
	The terminal should be installed in controlled lighting conditions. Avoid direct exposure to sunlight or to UV lights.
Certifications	CE, CB, FCC, RoHS, REACH, WEEE



Section 3: Installation Procedure

Before proceeding to the installation:

- Make sure that you have all the components described in “Components of the initial package” section at your disposal.
- Remove the bottom cover from the terminal (with its gasket), the top cover (see Figure 6 for how to unclip it) and the wall plate. Keep these elements at hand.

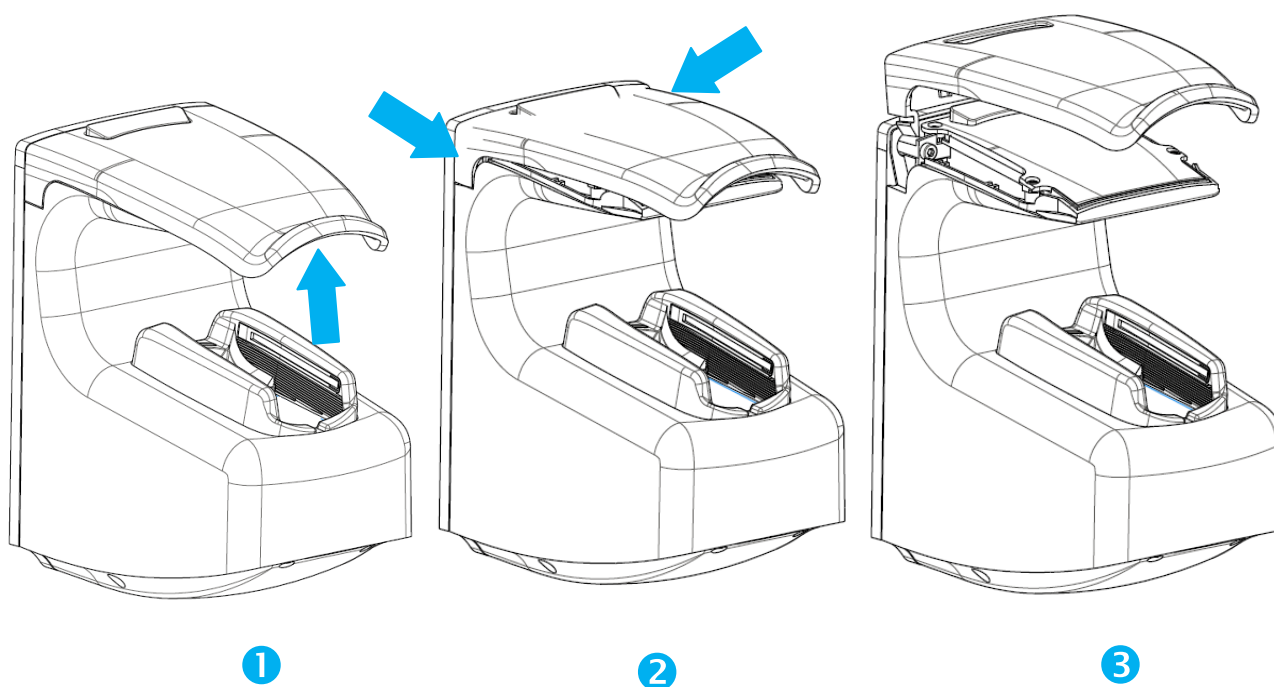


Figure 6: Removing the top cover

It is then possible to fix the terminal:

- either directly on a wall,
- or using a standard electric case (not provided).

The recommended height for fixing of the terminal lies between 1m and 1.20m.



For an optimal use the terminal must be installed in an area where the lighting conditions are controlled. Avoid direct exposure of the sensor to the sun light and to the ultraviolet rays (UV).

Installation directly on a wall

Required tools (not supplied)

- Two (2) rawplugs + two (2) $\varnothing$ 3.5mm max and length 30mm screws.
- One (1) screwdriver adapted to screws above.
- One (1) Drill (with a drill bit diameter adapted to rawplugs above).
- One (1) hole saw $\varnothing$ 67mm.
- One (1) Flat tip screwdriver (2,5mm) for block connector screws.
- A (1) Torx T10 screwdriver or a (1) regular 4 mm screwdriver.
- A (1) Torx T8 screwdriver.

Equipment from the initial package to use

- One (1) Terminal's body.
- One (1) wall plate.
- Four (4) M3x25 screws.
- One (1) bottom cover.
- Four (4) K2.5x8 screws.
- Two (2) Block connectors.
- One (1) top cover.

Step by step procedure



Power supply from electrical source shall be switched off before starting the installation.



The strength of the attachment depends on the solidity of the wall on which the terminal is mounted.



The adhesive foam joint at the back of the wall plate is required for sealing purposes (watertightness). If walls have a rough or uneven surface, a silicon bead may be required between the wall plate and the wall to ensure sealing.

1. If not present, drill in the wall a hole with a diameter of 67mm (see Figure 7).
2. Confirm the presence inside the hole of all the cables needed for the electrical installation (see Section 4: "Electrical Interface").
3. Drill in the wall 2 holes with a diameter adapted to screws and fit them with the rawplugs (see Figure 7 and Figure 8).

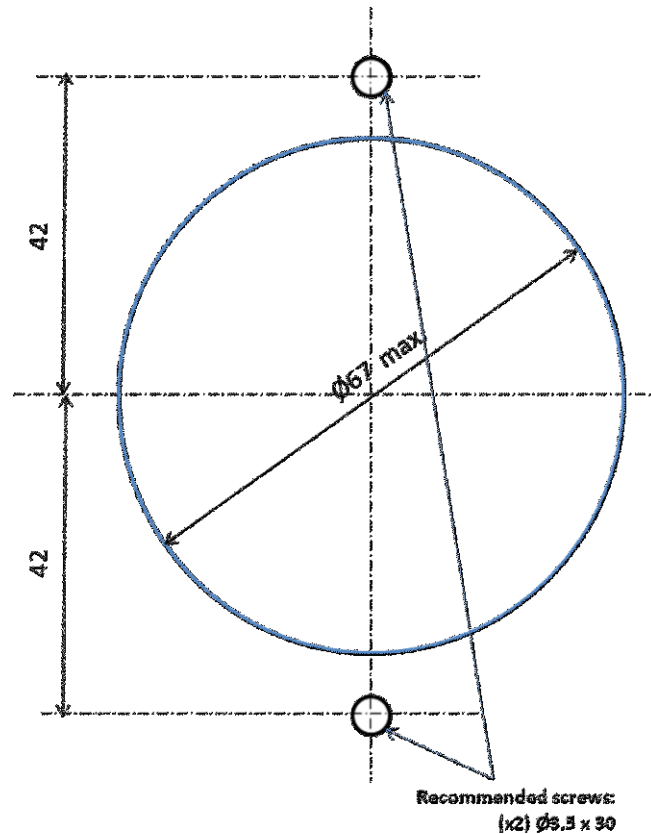


Figure 7: Drilling template

4. Place the wall plate against the wall, opposite the two holes pierced in the wall (see Figure 8).
5. Fix the wall plate using the two screws that fit the rawplugs (Max diameter: 3.5 mm, length 30 mm) (see Figure 8). Use the 2 upper screw shanks to make sure that the wall plate is mounted horizontally.
6. Connect the necessary cables on the block connectors according to Section 4: « Electrical Interface »; then plug the block connectors into the terminal blocks (4 on Figure 5).
7. Plug Ethernet cable (if present) into the RJ45 connector (3 on Figure 5).
8. Fix Terminal's body with four (4) M3x8 screws (Figure 9).

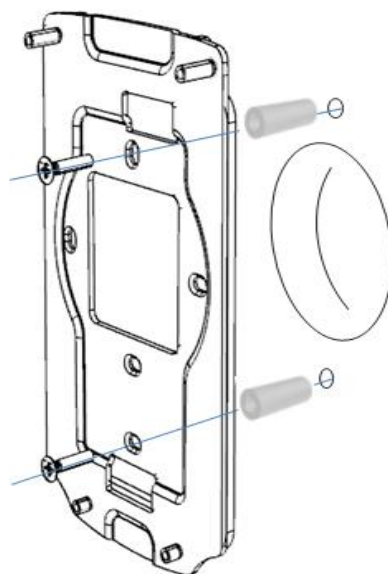


Figure 8: Wall plate fixing

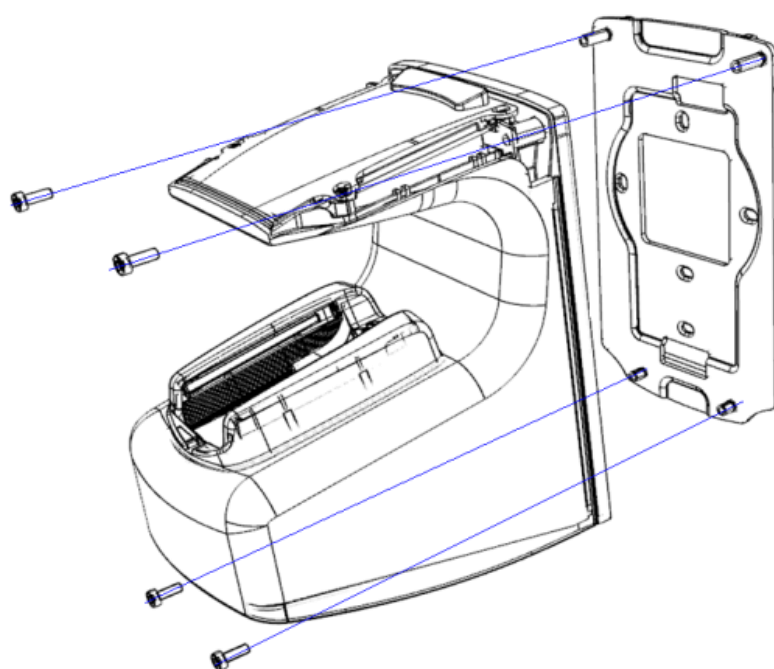


Figure 9: Terminal's Body fixation

9. Switch on power supply from electrical source and confirm that the terminal switches on (checking light from LED indicator and sound from buzzer).
10. At this stage, a USB mass storage key can be plugged into the terminal for configuration (see Figure 10). For more details about product configuration and setting, refer to MorphoAccess® VP Series User Guide. Once configuration is completed, remove the USB mass storage key.

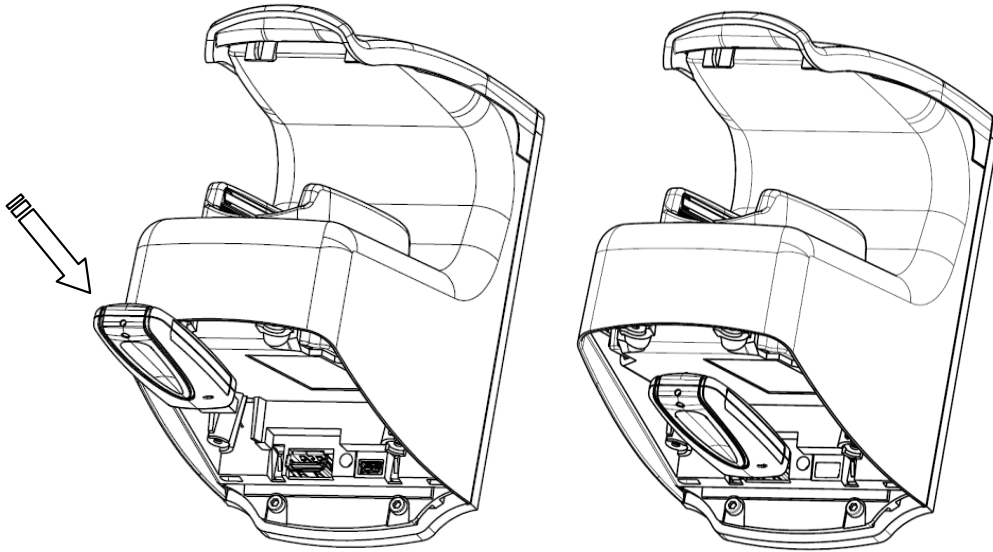


Figure 10: USB Mass Storage Key plug

11. Clip the top cover (see Figure 6, following steps 1 to 3 in reverse, and Figure 11).
12. Screw on the bottom cover (see Figure 11), using the four K2.5 x 8 screws.

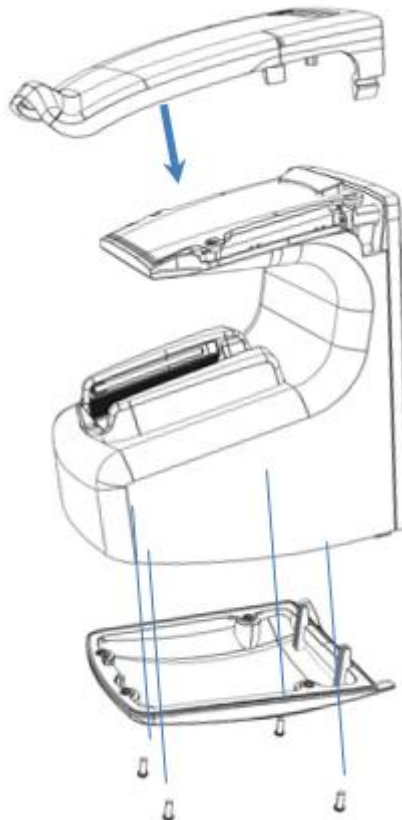


Figure 11: Assembling top and bottom covers

Section 3: Installation Procedure

13. Depending on the light environment, it will be necessary to use a protection accessory (reference 7 in Figure 12) on the terminal as shown in Figure 12. Remove the adhesive protection and place the protection accessory on the side walls of biometric sensor.

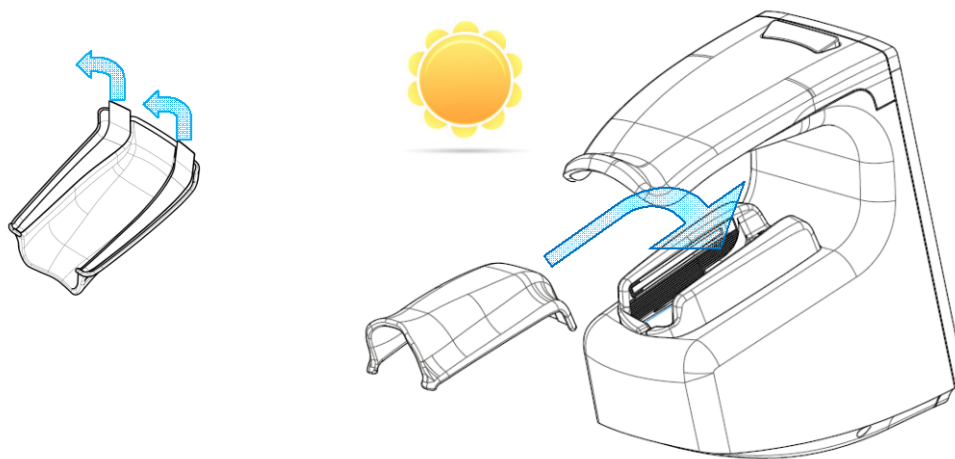


Figure 12: Assembling protection accessory

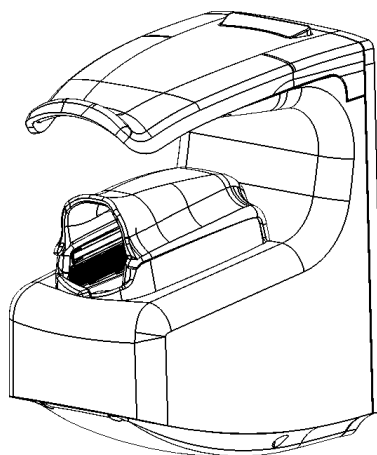


Figure 13: MorphoAccess® VP with protection accessory

Installation on a standard electric box (Example of European electric box)

Required tools (not supplied)

- A (1) screwdriver that fits the screw on the electric box.
- One (1) rawplug + one (1) $\varnothing$ 3.5mm max and length 30mm max screw.
- One (1) Drill (with a drill bit diameter adapted to rawplug above).
- One (1) Flat tip screw driver (diameter 2,5mm) for block connector screws.
- A (1) Torx T10 screwdriver or a (1) regular 4 mm screwdriver.
- A (1) Torx T8 screwdriver.

Equipment from the initial package to use

- One (1) Terminal's body.
- One (1) wall plate.
- Four (4) M3x25 screws.
- One (1) bottom cover.
- Four (4) K2.5x8 screws.
- Two (2) Block connectors.
- One (1) top cover.

Step by step procedure



Power supply from electrical source shall be switched off before starting the installation.



The terminal's attachment to the unit depends on the quality of the mounting of the standard electric box.



The adhesive foam joint at the back of the wall plate is required for sealing purposes (watertightness). If walls have a rough or uneven surface, a silicon bead may be required between the wall plate and the wall to ensure sealing.

1. Confirm the presence of the electric box ($\varnothing$ 65 mm for a standard box) in the wall or add it if not present. Remove the two horizontal screws from the electric box (see Figure 14): these screws will be used for terminal's body fixation.

Section 3: Installation Procedure

2. Confirm the presence of all the cables needed for the electrical installation (see Section 4: “Electrical Interface”).
3. Drill in the wall one hole with a rawplug diameter and fit it with the rawplug (see Figure 14). The hole centre can be located by placing the wall plate on the wall with its horizontal mounting holes facing the ones of the electric box.
4. Bring the wall plate close to the wall, opposite the 2 holes on the electric box and the rawplug (see Figure 14).
5. Fix the wall plate with the one screw $\varnothing$ 3.5mm max and length 30mm and the 2 screws coming from the electric box (see Figure 14).
6. Connect the necessary cables on the block connectors according to Section 4: “Electrical Interface”; then plug the block connectors into the terminal blocks (4 on Figure 5).
7. Plug Ethernet cable (if present) into the RJ45 connector (3 on Figure 5).



Please note that the third screw which is located on the bottom part of the terminal is optional. Use it only if necessary to strengthen this installation depending to the wall.

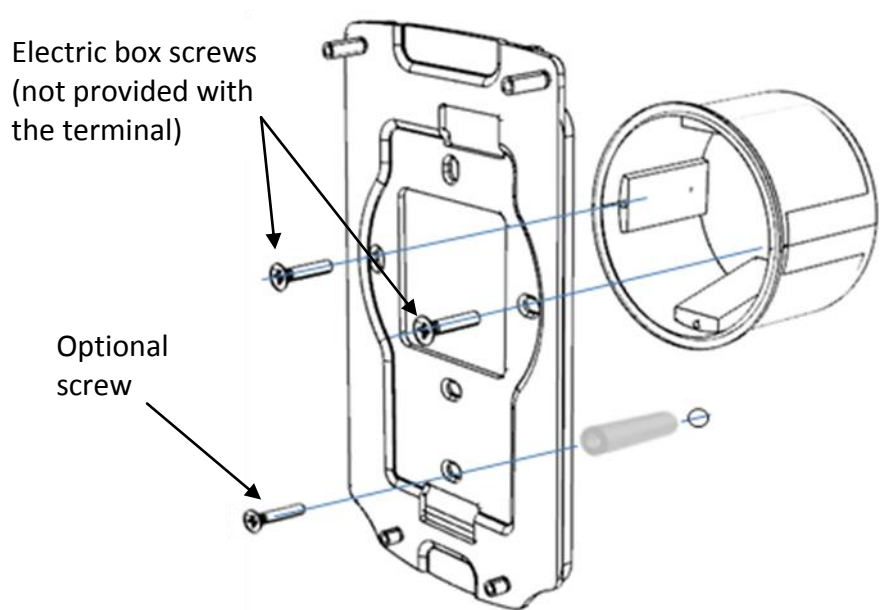


Figure 14: Wall plate fixation

8. Switch on power supply from electrical source and confirm that the terminal switches on (checking light from LED indicator and sound from buzzer).
9. At this stage, a USB mass storage key can be plugged into the terminal for configuration (see Figure 10). For more details about product configuration and setting, refer to MorphoAccess® VP Series User Guide. Once configuration is completed, remove the USB mass storage key.
10. Plug the top cover (see Figure 6, steps 1 to 3 in reverse, and Figure 11).

11. Fix the Bottom cover with the screwdriver (see Figure 11), using the four K2.5 x 8 screws.
12. Depending on the light environment, it will be necessary to use the protection accessory (reference 7 on Figure 12). Remove the adhesive protection and place the protection accessory on the side walls of the biometric sensor.

Installation on a standard electric box (example of NON-European electric boxes)

Required tools (not supplied)

- A (1) screwdriver that fits the screw on the electric box.
- One (1) rawplug + one (1) $\varnothing$ 3.5mm max and length 30mm max screw (option).
- One (1) Drill (with a drill bit diameter adapted to rawplug above) (option).
- One (1) Flat tip screw driver (diameter 2,5mm) for block connector screws.
- A (1) Torx T10 screwdriver or a (1) regular 4 mm screwdriver.
- A (1) Torx T8 screwdriver.

Equipment from the initial package to use

- One (1) Terminal's body.
- One (1) wall plate.
- Four (4) M3x25 screws.
- One (1) Bottom cover.
- Four (4) K2.5x8 screws.
- Two (2) Block connectors.
- One (1) Top cover.

Step by step procedure

Follow the procedure described in the section "Installation on a standard electric box (Example of European electric box)", as per illustrations in Figure 15

NOTE: For a distance center between of axes around 84mm, two screws are sufficient. For a distance center between of axes around 60mm, the third screw could be used.

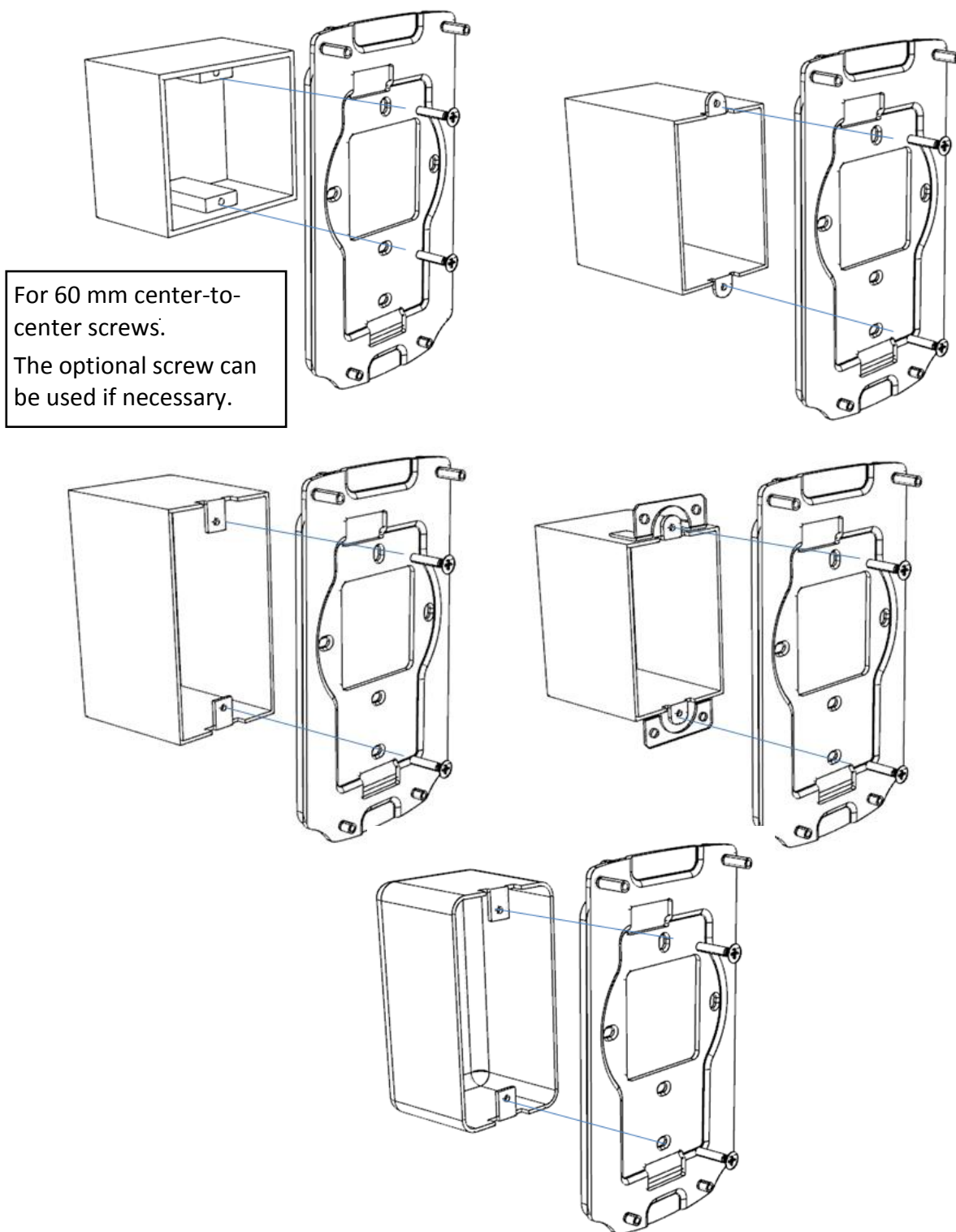


Figure 15: Sample of Electric boxes

Installation without electric box (Direct to the wall)

If it's necessary to use a mounting spacer (mounting spacer not supplied), it must be obligatory to follow the steps listed below:

- provide watertightness between the wall and the spacer (foam gasket, silicon bead),
- interface between the terminal and the wall must respect conditions below:
 - fixation between the terminal and the mounting spacer is made using the screw's holes indicated on the figure below (See preceding paragraphs to know how many screws are needed),

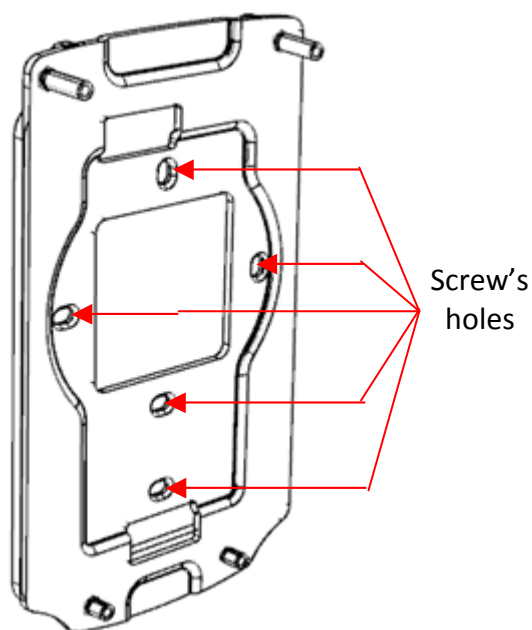


Figure 16: Fixing holes for mounting spacer

- mounting spacer must guarantee the watertightness with the terminal by compressing the foam gasket (striped area below). This area is located on the back of the wall plate and need to be compressed homogeneously (= 30% to 50% of the thickness),

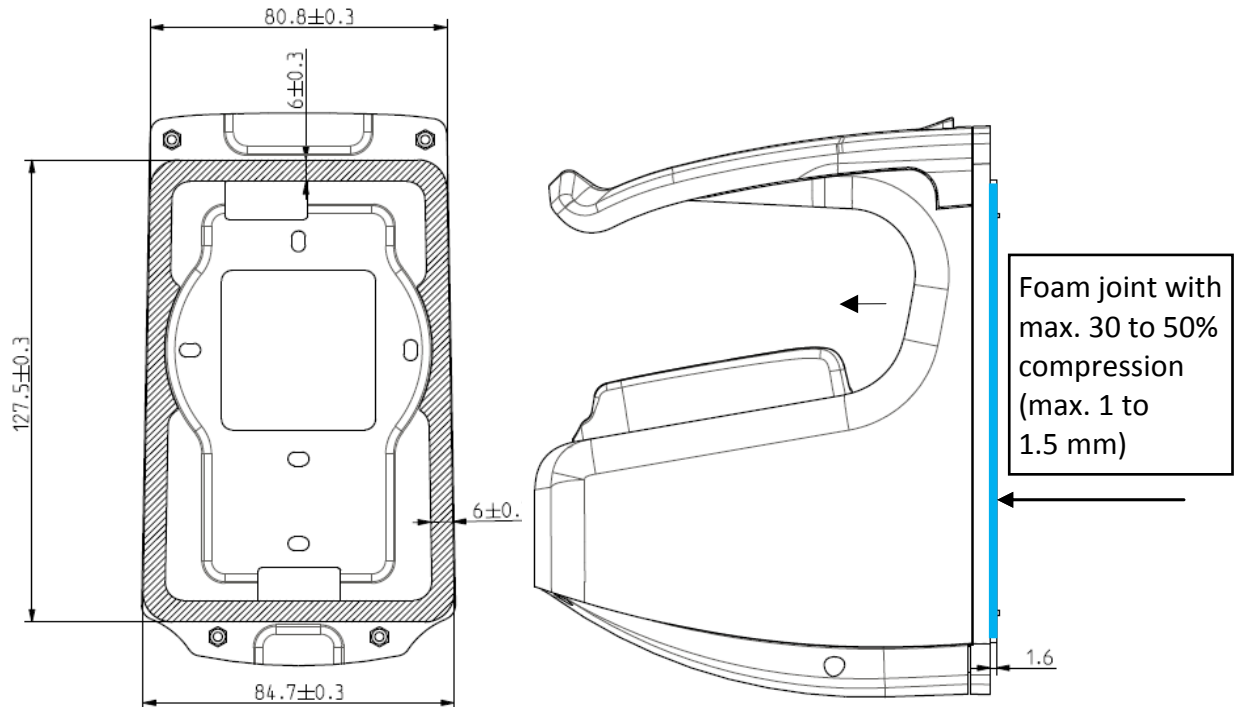
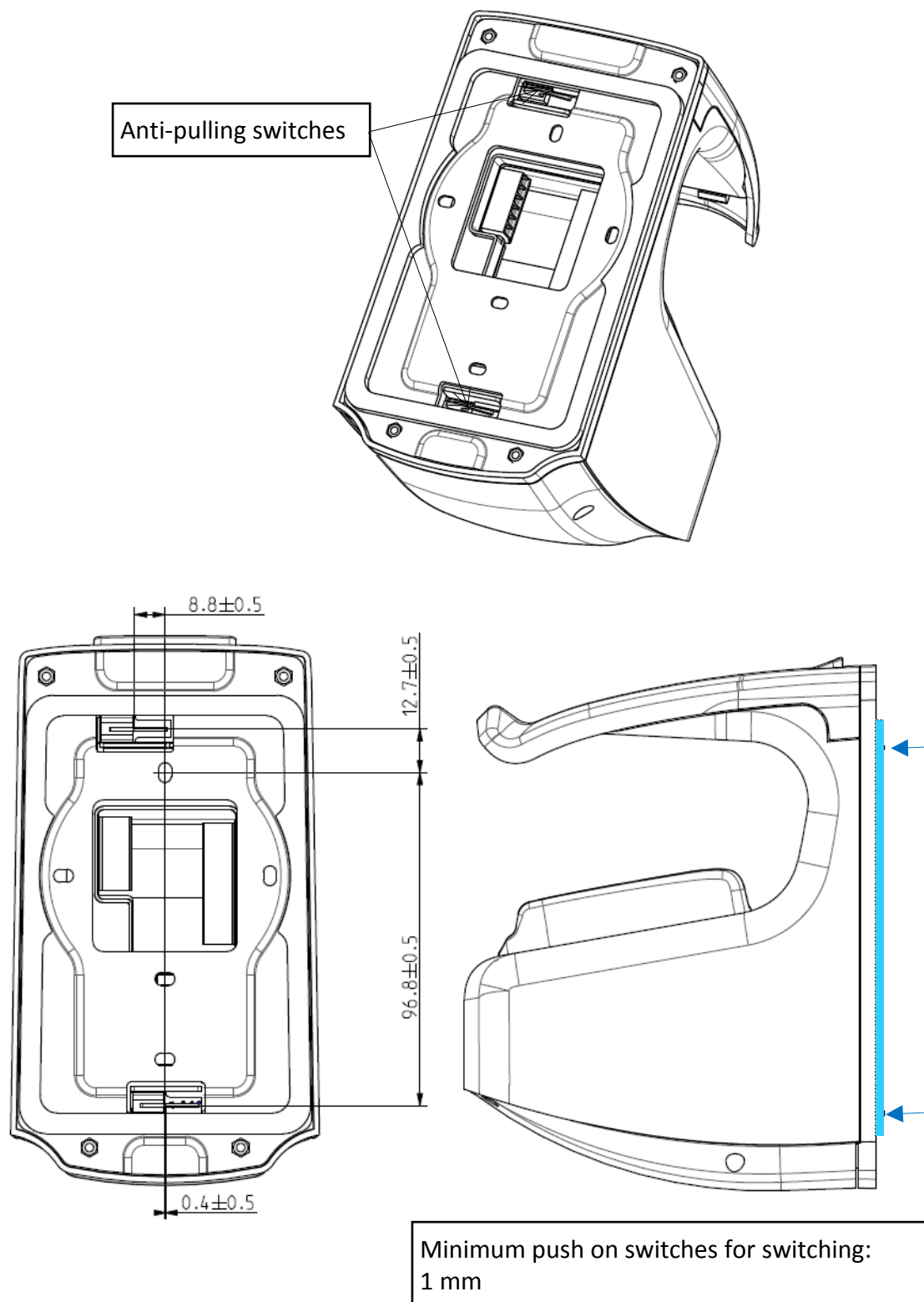


Figure 17: Sealing joint on wall plate / spacer

- the spacer needs to switch the two anti-pulling switches (if necessary):

**Figure 18: Anti-pulling switches**



Section 4: Electrical Interface

Wiring overview



Before proceeding, make sure that the person in charge of installation and connections is properly connected to earth, in order to prevent Electrostatic Discharges (ESD).

Note that all connections of the MorphoAccess® VP Series described hereafter are of SELV (Safety Electrical Low Voltage) type.

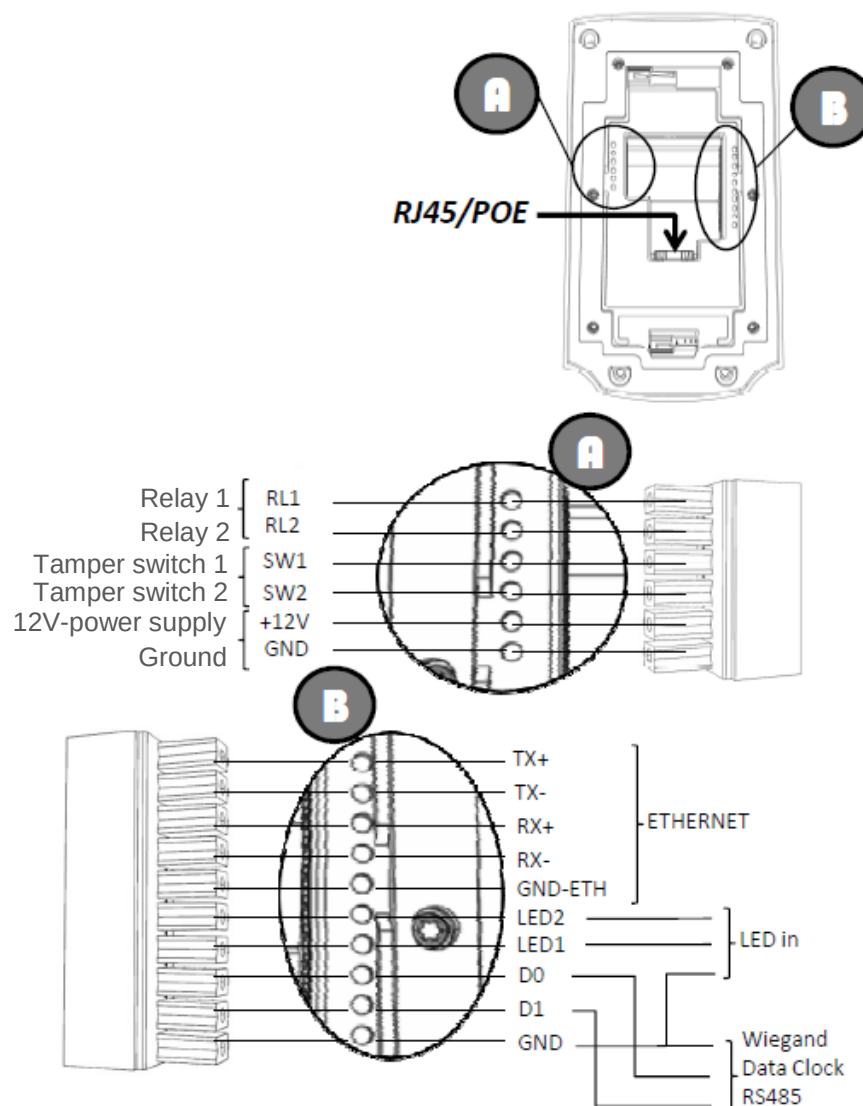


Figure 19: Cabling layout

NOTE: The “tamper switch” is a relay contact which indicates the current status of the anti-tamper switches (elements 6 on Figure 4) and anti-pulling switches (elements 2 on Figure 5).

To connect wire to block connector (6 and 10 pins), use the following tool (not supplied):

- one (1) flat print $\varnothing$ 2.5mm screwdriver for screws on the connector blocks.

Regarding the wiring order for connectors:

- first insert the 6 and 10 point connector block,
- then insert the RJ45 connector.

Regarding the disconnection of 6 and 10 point terminal connectors, use this tool (not supplied with the product):

- a flat print $\varnothing$ 2.5mm screwdriver to unplug the cables from the wires.

Output Relay

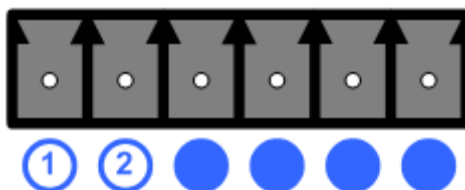


Figure 20: Internal relay block

- ① Relay 1 Contact Relay (RL1)
- ② Relay 2 Relay Strip (RL2)



Nominal characteristics of relay

Load characteristics:

- 1 A max @ 30 VDC (according to the safety extra low voltage requirements independently of the power supply),
- resistive load or inductive load; see warning information hereafter for inductive load.



Inductive load management requires a parallel diode for a better contact lifetime.

Example of connection for electrical door locks

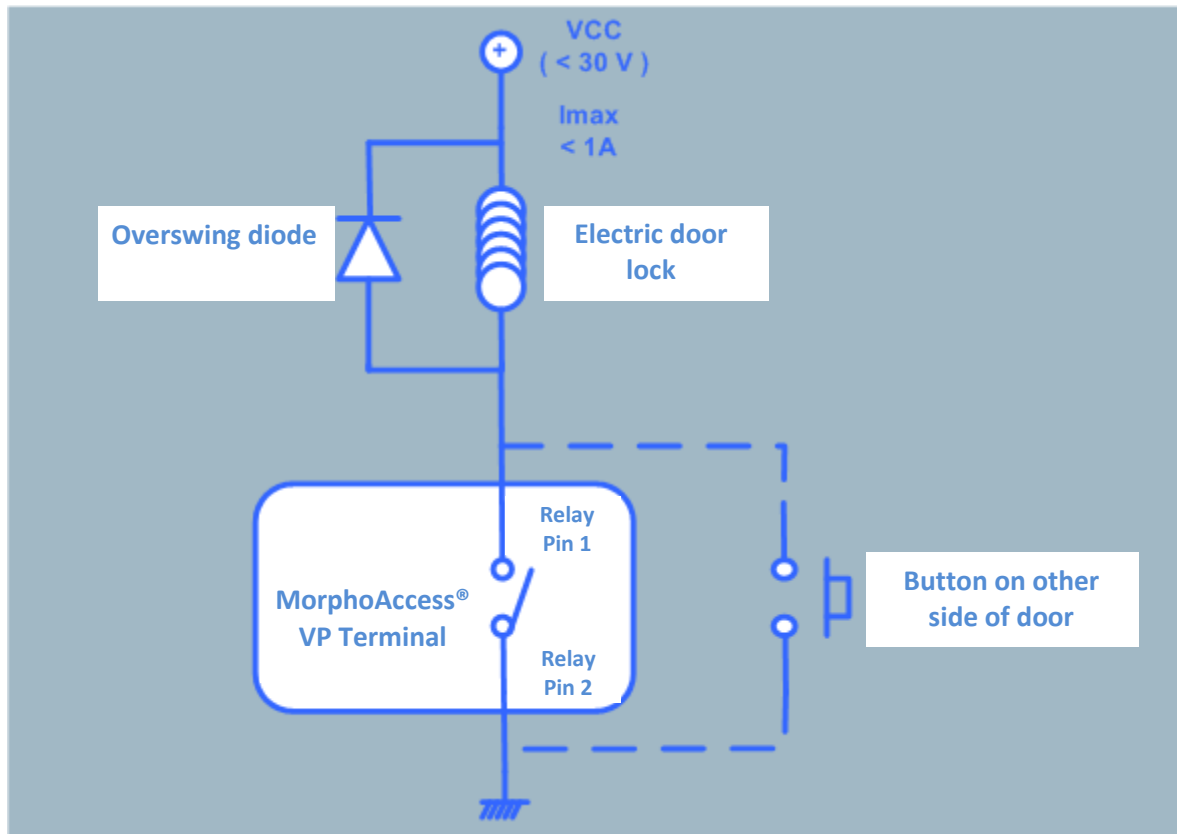


Figure 21: Example of electric latch connection

Tamper Switch

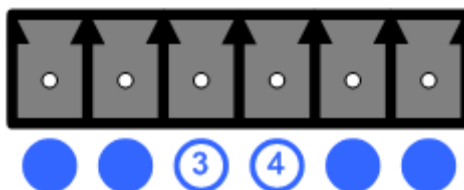


Figure 22: Tamper switch block

- | | | |
|---|-----------------------|------------------------|
|  | Tamper switch 1 (SW1) | Tamper switch contact |
|  | Tamper switch 2 (SW2) | Strip on tamper switch |

Operating principle for the switch

- Bottom cover screwed onto the terminal and terminal mounted on wall: switch enabled (contact closed).
- Bottom cover unscrewed and removed from terminal, or terminal removed from wall: switch disabled (contact open).

Nominal characteristics of switch block

50 mA at 20 VDC max according to the safety extra low voltage standard.



This MorphoAccess® VP Series terminal is part of security system; it is customer's responsibility to connect the tamper switch (contact) to physical access controller, in order to prevent the access to the connector blocks.

Power Supply

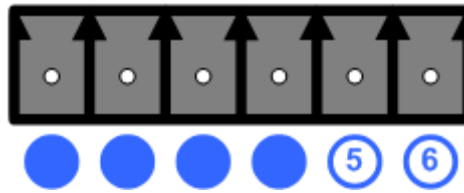


Figure 23: Power supply block

- ⑤ + 12 V Positive 12 Volts, power supply
- ⑥ GND Ground power supply

External power supply

- Must comply with CEE/EEC EN60950 standard.
- 12 Volts [9V-16V] (regulated) 1 Amp min.
- Could be provided by a 12 Volts Wiegand power supply, which complies with the Security Industry Association's Wiegand standard March 1995.

NOTE: *MorphoAccess® VP Series terminal's power supply can also be provided by the Ethernet using RJ45 connection (Power Over Ethernet mode).*

Wiegand output wiring

The following figure shows how to cable the wires of the serial port of the terminal for the Wiegand protocol.

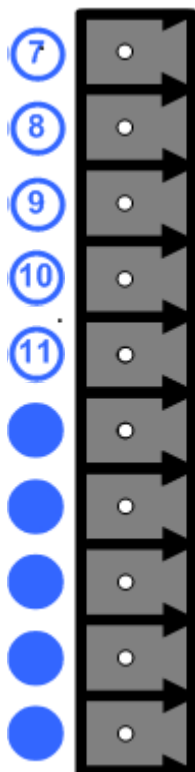


Figure 24: Serial port Block – Wiegand protocol

⑦	GND	Ground for Wiegand / RS485 / Dataclock
⑧	TR- / D1	Output Wiegand D1 wire
⑨	TR+ / D0	Output Wiegand D0 wire
⑩	LED1	Input Wiegand LED1 wire
⑪	LED2	Input Wiegand LED2 wire

Electrical interface is in conformity with the Security industry Association's Wiegand standard March 1995, and it is 5V TTL compatible.

The use of LED1 and LED2 wires is described in the paragraphs below.

The controller supports neither LED1 nor LED2 signals

When the access controller has no relay contact to provide an answer to the MorphoAccess® terminal, then the decision to emit either the “access granted” signal or the “access denied” signal is taken by another way. It is either the MorphoAccess® terminal itself that decide, or it waits for the access controller answer through the local area network (TCP), or on the serial port in (RS422).

It is strongly recommended to disable the LED IN feature, to avoid any interference on MorphoAccess® terminal behavior.

The controller supports only LED1 signal

When the access controller has only one relay contact which is dedicated to the “access granted” answer, this one must be connected between the LED1 and GND wires.

The MorphoAccess® terminal considers that the answer of the access controller is “access granted” “when the LED1 wire is set to low level (this happens when the access controller closes the contact connected between the LED1 and the GND wires).

The MorphoAccess® terminal considers that the answer of the access controller is “access denied” when the LED1 wire remains to high level until timeout occurs, while waiting for the answer from the access controller.

To minimize at most the waiting time of the user, the MorphoAccess® terminal timeout value must be adjusted to a value a little bit higher than the maximal value of the controller response time.

Warning: if the LED2 wire is connected, it must be constantly maintained in the high state.

The controller supports LED1 and LED2 signals

When the controller supports one relay contact for each of the possible answers then:

- the “access granted” contact must be connected between the LED1 and the GND wires of the terminal
- the “access denied” contact must be connected between the LED2 et the GND wires of the terminal.

The MorphoAccess® terminal considers that:

- The answer of the controller is "access granted", when the controller puts the LED1 wire to the low state (by closing a contact between the LED1 and the GND wires), and leaves the LED 2 wire to the high state.
- The answer of the controller is "access denied", when the controller puts the LED2 wire to the low state (by closing a contact between the LED2 and the GND wires), whatever is the state of the LED 1 wire.

Section 4: Electrical Interface

The MorphoAccess® terminal also considers that the answer of the controller is "access denied" in case of time-out while expecting for a low level on the LED1 terminal or on the LED2 terminal.

Serial port cabling for DataClock and RS485 protocols

The following figure shows how to cable the wires of the serial port of the terminal, for the DataClock protocol or for the RS485 protocol.

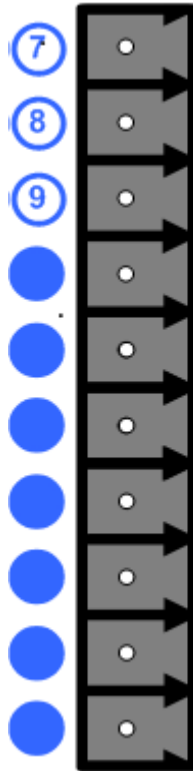


Figure 25: Serial port terminal, DataClock and RS485 protocols

	Item	DataClock	RS485
⑦	GND	Ground	Ground
⑧	TR- / D1	Clock	RS485 TX / RX-
⑨	TR+ / D0	Data	RS485 TX / RX +

Specific cabling for DataClock

The electrical interface is 5V TTL compatible.

Specific cabling for RS485

For a half-duplex RS485 connection, only Tx/Rx+, Tx/Rx- and ground reference signals are necessary.

Depending on RS485 network, an impedance adaptation may be required.

Ethernet wiring

Ethernet interface can be used to power the MorphoAccess® VP Series terminal through POE (Power Over Ethernet) mode. According to the POE standard two modes are available: power on data pins and power on dedicated pins.

On MorphoAccess® VP Series terminal, POE can be used with RJ45 connector or with block connector. Modes are implemented as follows:

- POE through RJ45 connector: on data pins or on dedicated pins,
- POE through block connector: only on data pins.

Use either one of these modes depending on POE implementation on your local Ethernet network

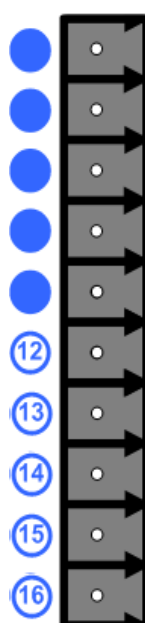


Figure 26: Ethernet Block

- | | | |
|---|------|---|
| ⑫ | GND | Ground for Ethernet interface (LAN 10 / 100 Mbit/s) |
| ⑬ | RX- | Receive negative Ethernet |
| ⑭ | RX+ | Receive positive Ethernet |
| ⑮ | TX - | Transmit negative Ethernet |
| ⑯ | TX+ | Transmit positive Ethernet |

Default IP address from factory

134.1.32.214

Recommendations for RJ 45 wiring

Pin	1	2	3	4	5	6	7	8
Signals	TX(+)	TX(-)	RX(+)	NC/POE pin dedicated (+)	NC/POE pin dedicated (+)	RX(-)	Ground/ pin dedicated (-)	NC/POE pin dedicated (-)
EIA / TIA T568B Colors	White orange	Orange	White green	Blue	White blue	Green	White brown	Brown
EIA / TIA T568A Colors	White green	White green	White green	White green	White green	White green	White green	White green
Corel L120 Colors	Grey	White	Pink	Orange	Yellow	Blue	Purple	Brown

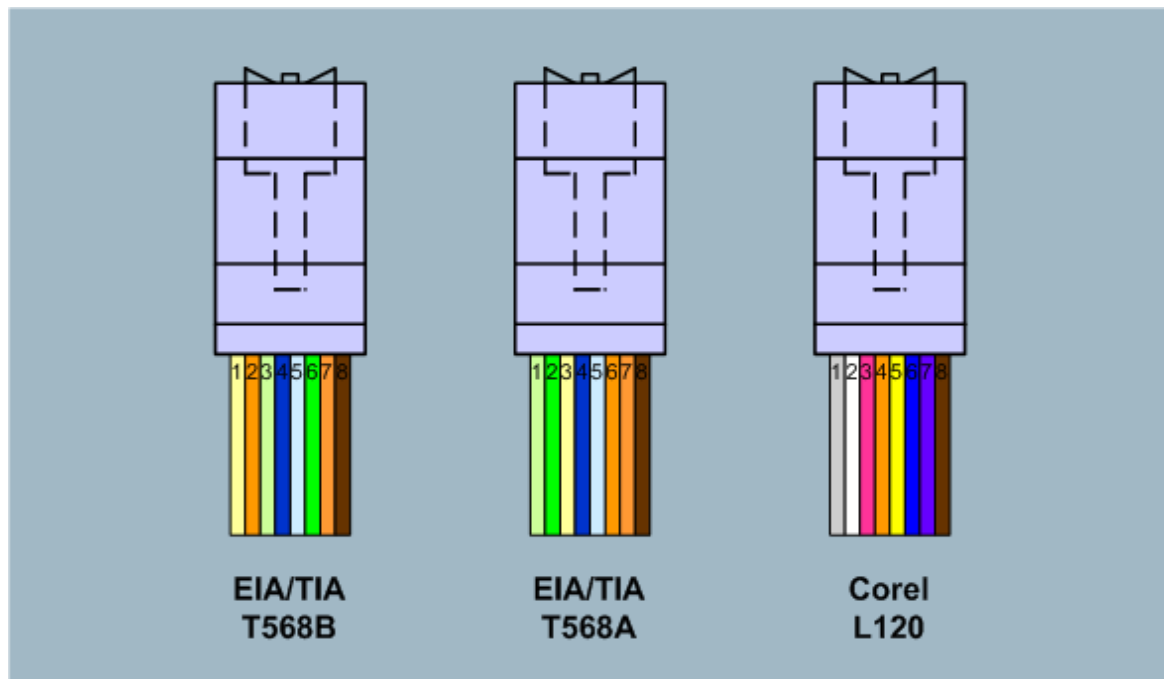


Figure 27: RJ45 wiring



Section 5: User Interface

Modes for controlling access rights

Introduction

The MorphoAccess® VP terminal offers several methods for controlling access rights: it needs to be configured in one of the following four modes:

- Identification mode,
- Authentication mode (requires a contactless smartcard reader in the terminal),
- Multi-factor mode (requires a contactless smartcard reader in the terminal),
- Proxy mode.

Identification mode

The user requests access by placing a finger on the biometric sensor. The terminal compares the biometric data of the finger with all the biometric data stored in its local database. Access is authorized if the terminal finds a correspondence.

This is the default mode for terminals that are not equipped with a contactless smartcard reader.

For further information, please see the "Identification mode" section in the MorphoAccess® VP terminal user manual.

Authentication (verification) mode

The user requests access by placing his contactless card on the terminal smartcard reader (integrated in the top part of the terminal). The terminal checks the compatibility of data on the card then asks the user to place a finger on the biometric sensor.

The terminal then compares the biometric data of the finger with the user's reference biometric data read on his personal contactless card.

Access is authorized if the terminal finds a correspondence.

For further information, please see the "Authentication mode" section in the MorphoAccess® VP terminal user manual.

Multi-factor mode

In this mode, the "identification" and "authentication" modes are available simultaneously; the user decides which control method will be used:

- by placing his finger on the sensor, thereby triggering the identification process,
- by placing his contactless card on the reader, thereby triggering the authentication process,

This is the default mode for terminals fitted with a contactless smartcard reader.

For further information, please see the "Multi-factors method" section in the MorphoAccess® VP terminal user manual.

Proxy mode

In this mode, the access rights check process is controlled by an application on a host system. This application sends commands to the terminal to tell it on how to proceed. For further information, please see the "Proxy Mode" section in the MorphoAccess® VP terminal user manual.

Configuring the terminal

The following methods can be used to configure a MorphoAccess® terminal:

- through the Ethernet interface (remote management)
- via a Wi-Fi™ connection (license and dongle required)
- using USB key containing configuration scripts (local management)

Configuration procedures are described inside the MorphoAccess® VP Series User Guide as follows:

- Section 3: Terminal Configuration
- Annex 1: Terminal Customization

The operating methods are described in the sections between Section and Annex 1.

Anti-tamper and anti-pulling switches

Anti-tamper switches

Please refer also to “Tamper Switch” section.

These switches are enabled when the bottom cover is fixed to the terminal

When the switches are deactivated, the MorphoAccess® VP Series terminal acts as required by the related configuration key (see MorphoAccess® VP Series User Guide for key configuration description):

- Ignore the event (default): useful during normal maintenance operations.
- Send an alarm message to the Central Access Controller, through the usual channel of the access control result messages (Wiegand, DataClock, RS485, Ethernet or Wi-Fi™). An alarm switch (relay contact) is directly available on block terminal «tamper switch pins». Please refer to “Wiring overview” and to “Tamper Switch” sections.
- Generate an audible alarm signal with the buzzer and a visual alarm signal with the status Led.

Anti-pulling switches

Please refer also to “Tamper Switch” section.

These switches are activated as soon as there is enough pressure applied on the terminal against the wall or the mounting spacer. They are deactivated as soon as this pressure is not big enough, e.g. when the terminal is pulled out of the wall.

When the switches are deactivated, the MorphoAccess® VP Series terminal acts as required by the related configuration key (see MorphoAccess® VP Series User Guide for key configuration description):

- ignore the event (default): useful during normal maintenance operations,
- send an alarm message to the Central Access Controller, through the usual channel if the access control result messages (Wiegand, DataClock, RS485, Ethernet or Wi-Fi™). An alarm switch (relay contact) is directly available on block terminal “tamper switch pins”. Please refer to “Wiring overview” and to “Tamper Switch” sections.,
- generate an audible alarm signal with the buzzer and a visual alarm signal with the status LED.



Section 6: Accessories, Software Licenses and PC Applications

Compatible Accessories, Licenses and Software

The following items can be ordered directly to Morpho or to an official distributor, so as to enjoy all the features of your MorphoAccess® VP Series terminal:

- Power supply units,
- Contactless smartcards: MIFARE® 4K; DESFire® 2K, 4K or 8K,
- MA WI-FI PACK, containing a Wi-Fi™ USB dongle and a Wi-Fi™ license to activate Wi-Fi™ capability on your terminal,
- MA_10K_USERS license, enabling database size upgrade from 5,000 to 10,000 users capacity (*2 fingers per record) at creation of the database.

Compatible PC applications

MorphoAccess® VP Series terminals are fully compatible with:

- MorphoEnroll™ enrollment application,
- the low level protocol using ILV commands,
- Morpho Integrator's Kit (MIK) software development kit (pending release).



Section 7: Recommendations

Notice

The manufacturer cannot be held responsible in case of non-compliance with the following recommendations or incorrect use of the terminal.

General precautions

- Do not attempt to repair your MorphoAccess® VP Series terminal yourself. The manufacturer cannot be held responsible for any damage/accident that may result from attempts to repair components. Any work carried out by non-authorized personnel will invalidate your warranty.
- Do not expose your MorphoAccess® VP Series terminal to extreme temperatures.
- Use your MorphoAccess® VP Series terminal with original accessories. Attempts to integrate unapproved accessories to the MorphoAccess® VP Series terminal will void your warranty.
- Due to electrostatic discharge, and depending on the environment, synthetic carpet should be avoided in areas where the MorphoAccess® VP Series terminal has been installed.

Areas containing combustibles

It is strongly recommended that you do not install your MorphoAccess® VP Series terminal in the vicinity of gas stations, petroleum processing facilities or any other facility containing flammable or combustible gasses or materials.

Specific precautions for terminals equipped with a contactless smartcard reader

It is recommended to install MorphoAccess® VP Series terminals equipped with a contactless smartcard reader at a certain distance (> 30cm) from metallic elements such as iron fixations or lift gates. Performances in terms of contactless badge reading distance will decrease when metallic elements are closer.

Ethernet connection

It is recommended to use a category 5 shielding cable (120 Ohms). It is also strongly recommended to insert a repeater unit every 90m.

Extreme care must be taken while connecting Ethernet wire to the MorphoAccess® VP Series terminal block board since low quality connection may strongly impact Ethernet signal sensibility.

It is recommended to connect Rx+ and Rx- with the same twisted-pair wire (and to do the same with Tx+/Tx- and the other twisted-pair wire).

Date / Time synchronization

If you want to use the MorphoAccess® VP Series terminal for application requiring high time precision, we recommend synchronizing regularly your MorphoAccess® VP Series terminal time with an external clock.

The MorphoAccess® VP Series terminal clock has a $\pm 40.10^{-6}$ (ppm) typical time deviation at +25°C (roughly ± 4 sec per day).

At +45°C, the time deviation may be up to ± 8 sec per day.

Cleaning precautions

The use of a dry cloth is recommended to clean the terminal, especially the biometric sensor. Acid liquids, alcohol or abrasive materials are prohibited.



Appendix 1 : Finger Placement Recommendations

Most useful areas for biometric data

Areas with the most useful biometric data are different according to the type of biometric data:

- **Fingerprint:** the most useful zone is around the centre of the first phalanx of the finger.
- **Vein network:** the useful zone is between the first and third phalanx of the finger.

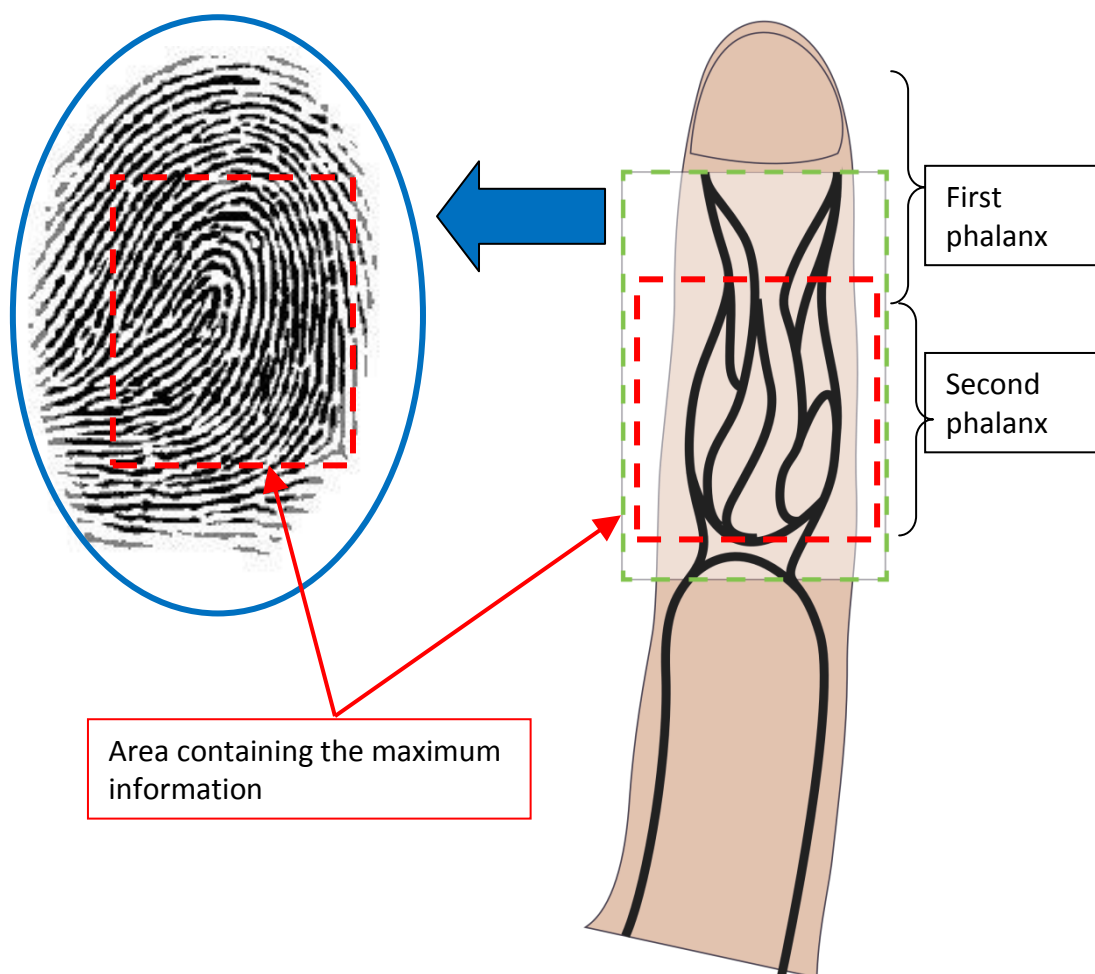


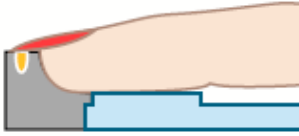
Figure 28: Most useful areas for biometric data

The sensor is designed so that when the fingertip is in contact with the rounded hollow guide:

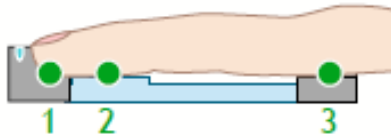
- the central zone of the first phalanx is aligned with that of the section dedicated to the fingerprint capture,
- the second phalanx is positioned inside the section dedicated to capturing the finger vein network.

Position of finger

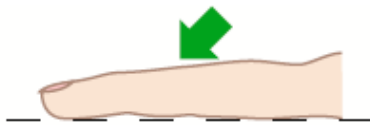
Correct position



- Place the fingertip in contact with the rounded hollow guide (1).
- In case of long nail, pass it over the fingertip guide so that the fingertip is correctly in contact with the hollow guide (1) and not the tip of the nail.



- Keep the fingertip in contact with the rounded hollow guide (1).
- Make sure that the fingerprint is properly in contact with the transparent optical surface (2).
- Place the base of the finger in the position guide on the other side (3).
- Let rest the palm of the hand on the shell of the terminal.



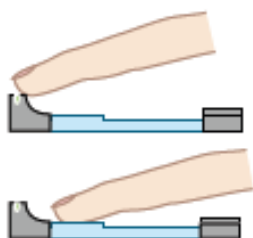
- Keep the finger straight.

Figure 29: Recommended finger positions

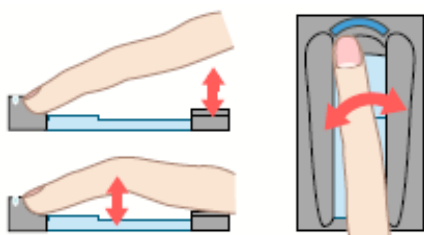
To guarantee good acquisition quality, please leave the finger on the biometric sensor until the backlighting switches off.

Bad finger position

The following figures show incorrect finger positions.



- Do not place the fingertip on the top of the fingertip guide.
- Do not place the fingertip on the surface of the sensor: it must be in contact with the rounded hollow guide.



- Do not leave the finger in the air.
- Do not bend the finger.
- Do not tilt the finger: it must be parallel with the sensor's walls.



- Do not roll the finger.
- Do not bend the finger upwards.
- Do not bend the finger downwards.

Figure 30: Incorrect finger positions

Condition of the finger

Please follow these recommendations to improve acquisition quality:

- wipe the finger if it is too wet,
- warm the finger if cold or dry,
- lightly moisten the finger if dry,
- clean the finger if dirty,
- remove any band aids and adhesive tape if they are obstructing the fingerprint or second phalanx of the finger,
- do not press down too hard and do not contract the finger to avoid constricting blood vessels.



Appendix 2 : Bibliography

How to get the latest versions of documents

The latest version of the documents is available on CD-ROM package from our factory, or can be downloaded from our Website at the address below:

www.biometric-terminals.com

(Login and password required).

To request a login please send us an email to the address below.

hotline.biometrics@t.my-technicalsupport.com

Documents concerning the MorphoAccess® terminal

Documents about installing the terminal

MorphoAccess® VP Series Installation guide ref. SSE-0000083011

This document describes the different functions available on the terminal and procedures for configuring the terminal. This document is in English.

Documents about using the terminal

MorphoAccess® VP Series User Guide, ref. SSE-0000082427

This document describes the different functions available on the terminal and procedures for configuring the terminal. This document is in English.

Administrator Information

MorphoAccess® Parameters Guide, ref. SSE-0000062458

This document contains the full description of all the terminal configuration parameters. This document is in English.

SSL Solution for MorphoAccess®, ref. SSE-0000069007

This document describes the roll-out of the SSL Solution for MorphoAccess®. This document is in English.

MorphoAccess® Terminal License Management, ref. SSE-0000066855

This document explains how to load and read licenses in a MorphoAccess® terminal. This document is in English.

MorphoAccess® Enrollment Station – User guide, ref. SSE-0000062354

Chapter 15 "Configuring network parameters on a MorphoAccess® terminal" describes how to configure network parameters (Wired or Wi-Fi™) on a MorphoAccess® terminal using the MATM application. This document is in English.

Documents for the developer

MorphoAccess® Host System Interface Specifications, ref. SSE-0000056821

This document contains the full description of all commands accepted by a MorphoAccess® terminal. This document is in English.

MorphoAccess® Contactless Card Specifications, ref. SSE-0000062610

This document describes the characteristics of contactless cards managed by a MorphoAccess® terminal. This document also describes the format of data stored on the card. This document is in English.

MorphoAccess® Remote Messages Specification, ref. SSE-0000062580

This document describes the format of messages sent by the terminal to a distant system. This document is in English.

Support tools

MorphoAccess® Configuration Tool User Guide, ref. SSE-0000036539

This document describes the Configuration Tool application, which enables to configure a MorphoAccess® terminal through an IP link (Ethernet or Wi-Fi™). This document is in English.

MorphoAccess® Terminal Management User Guide, ref. SSE-0000068869

This document describes the MATM application, which enables to configure a MorphoAccess® terminal through Ethernet or Wi-Fi™. This document is in English.

MorphoAccess® USB Network Tool User Guide, ref. SSE-0000043164

User guide of the configuration application dedicated to network parameter setting, using a USB mass storage key. This document is in English.

MorphoAccess® USB encoder User Guide, ref. SSE-0000050386

User guide of the application dedicated to MorphoAccess® terminal configuration, using a USB mass storage key. This document is in English.

MorphoAccess® Firmware Upgrade Guide, ref. SSE-0000038184

This document provides a detailed description of the different procedures for updating the firmware of the MorphoAccess® terminal. This document is in English.



Appendix 3 : Support

Troubleshooting

The IP address for the terminal is unknown or it is not possible to connect to the terminal

Use USB Network configuration tool to configure a valid set of network parameters in your terminal. Please refer to [MorphoAccess® USB Network Tool User Guide](#) document.

The sensor is switched off

Check that the database contains at least one record.

Check that the identification mode is enabled.

The terminal returns erratic responses to Ping commands

Check the subnet mask.

Ask the network administrator for the correct value.

Check that each device connected to the network has a different IP address.

Contacts

Customer Service

Morpho

SAV Terminaux Biométriques
Boulevard Lénine - BP428
76805 Saint Etienne du Rouvray
FRANCE
Phone: +33 2 35 64 53 52

Hotline

Morpho

Support Terminaux Biométriques
18, Chaussée Jules César
95520 Osny
FRANCE

hotline.biometrics@t.my-technicalsupport.com

Phone: + 33 1 58 11 39 19

(9H00am to 6H00pm French Time, Monday to Friday)

<http://www.biometric-terminals.com/>

A login and password are required to access the full site content. If you don't have one, please send us an email to the address above to request one.

Contact by email is preferred.

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